cesses, and when the test is observed with adherent sand they cannot be seen at all.

Large spineless tests of Centropyxis, from ditches below the city, measure .26 mm. broad, .22 wide, and .08 high; with the mouth .1 diameter. Large spinous specimens, from the same locality, measure .22 broad by .208 wide, with the spines .48 long and the mouth .084.

A Difflugian of the sub-generic character I have indicated under the name of *Nebela* appears related with *Centropyxis*. Briefly described, it may be distinguished as follows:—

NEBELA CAUDATA.

Test compressed ovoid, laterally pyriform; mouth terminal, oval, entire; fundus obtuse and bordered with from four to five hollow, linear obtuse appendages. Structure of test apparently chitinous and indistinctly areolated. Sarcode colorless. Length $\frac{1}{12}$ mm., breadth $\frac{1}{16}$ mm., thickness $\frac{1}{42}$ mm. Living in sphagnum of a cedar swamp, at Absecom, New Jersey.

On the Nature of Root Fibres.—Mr. THOMAS MEEHAN remarked that two excellent papers had recently appeared on the eccentric growth of the annual layers of wood in some plants—one in the Proceedings of the Poughkeepsie Natural History Society, and the other in the American Naturalist. Reading these, it occurred to him that some observations of his on the nature of fibrous roots of plants were not generally known, and might interest the Academy.

In regard to the eccentricity of the wood, it was long known to observers that the pith of trees was often not in the centre, but varied considerably in its approaches to the circumference. In one case noted in the paper in the Naturalist, the pith of the poison vine was very near the outer edge of the wood, and somewhat elevated, forming a little ridge all along the bark. Various theories had been offered to account for this extra thickening on one side, but none of them, Mr. Meehan thought, accorded with all the known facts, and he believed the true explanation still awaited some fortunate discoverer. The author of the paper in the Poughkeepsie Proceedings had followed the wood chopper, and found that in perfectly erect trees, the pith was exactly in the centre, but in trees that leaned a little, as many would from being drawn towards the lightest places in infancy, the extra thickening was always on the under side. But in the paper in the Naturalist, the observer showed that in the poison vine, though growing to a perfectly upright tree, there was still this remarkable eccentricity, and further, that the degree of this eccentricity varied in the same stem at different places, although all in the same ascending line. The sloping theory, though supported by a remarkable uniformity of figures, could not be correct.

But his remarks had relation chiefly to a suggestion in the *Nat-*

uralist that the rootlets of the poison vine, in some cases referred to by the observer, appeared to be several years old. The fact was that these rootlets were never but one year old, a new set being produced every year. This was the case in the poison vine, the trumpet vine, the English ivy, the Virginia creeper when it sometimes produced them, and amongst others generally in the cases of epiphytal orchids. In this respect they followed the same law as prevailed with fibrils under the ground, and indeed the same law prevailed for the whole system of the tree. We say of the inflorescence, that all its parts are but modified leaves, but this is true of all parts. A whole tree is but a modification of a primordial leaf; the rootlets and the branchlets. The roots and the branches are more or less subject to the same laws that govern leaf structure. Leaves fall annually, unless very favorably situated as regards nutrition. Sometimes, as in some evergreens, the greater part of the leaf is conjoined with the stem, or even becomes an imperfect branch, and in these cases is more permanent. In arbor vitæs, deciduous cypress, and some others, the branchlets and leaves are so closely identified, that the general annual character of the leaves extends to the branchlets, and large numbers drop at the regular fall season. Those which are the most favorably situated as regards nutrition, get through the winter season, and after this become branches, and may live to an indefinite period. The root system is the analogue of that which ascends into the atmosphere, and similar laws prevail. The fibrils are the counterparts of leaves, and die annually; but a few, which are more favorably situated as regards nutrition, manage to live over winter, and then become roots that live to an indefinite period. The rootlets on the stems of the creeping vines are of the same character. Seeming but cellular expansions from the bark, they generally die, but if one get into the decaying portion of a hollow tree, or near rich earth, it is so favorably disposed as regards nutrition, that it will live on and become a root. Cases are on record where English ivy has been cut away at the roots from all connection with the ground, and, having lived, the hasty conclusion was formed, that it was drawing sustenance from the air; but further examinations have shown that in these cases some of the annual rootlets had become true roots, penetrating old mortar, and other congenial matter, and thus lived on and contributed materially to the ivy's support.

It had been suggested that the eccentricity of the wood in the poison vine might be owing to the rootlets coming out on the side next the tree, and in this way favorably affecting that side; but the rootlets of the poison vine come out indiscriminately all round the poison vine branch, and as often on the upper as on the lower side. Besides this, in a branch of the Ampelopsis which he exhibited, covered with these rootlets on every side, and which had been hanging like a rope to a tree for a number of years, the wood was so eccentric that the pith was three-fourths further from

one side than the other. That the protrusion of roots on one side had nothing to do with eccentricity, was also clear from the fact that he had examined Symphoria, Wistaria, and many other things with rooting, creeping branches on the ground, in all of which the wood was perfectly concentric.

Notes on two Traps; A Case of Alteration of Earthy Sediments.—Prof. PERSIFOR FRAZER, Jr., remarked, that, at a previous meeting of the Academy the occurrence of a vein of quartz in a mass of dolerite had been described. The specimen has been since cut in two by a lapidary in such a manner as to illustrate (1) the central band of quartz (part of which appears to be hyaline and part anhydrous) inclosing numerous small fragments of the adjoining dolerite. (2) Two bands of darker color than the mass of the latter, which appear to form the boundary walls between the vein and the dyke which it intersects. (3) A broad margin of unaltered dolerite on either side. This specimen is presented for the inspection of the Academy.

The whole subject of the origin and true nature of "traps," and the means of distinguishing those which have been cooled from a molten mass from those which are indurated, baked, or altered to crystalline rocks from earthy sediments by the proximity of sources of heat, is one yet involved in much obscurity. I have here a specimen of what appears to be a baked sandstone belonging to the New Red Formation, in which a part of the mass, occupying an irregular space in one of its ends, has become a coarsely crystallized syenite. The specimen was obtained from near Harman's blacksmith shop, in the northern and western part of York County.

Notes on some Palæozoic Limestones.—Prof. PERSIFOR FRAZER, Jr., remarked that among the many interesting chemical problems connected with geology is that of the relation of a percentage of magnesia to the mode of formation and age of the limestones of the world. Not only have some very interesting speculations been made as to the condition of the earth's crust during the production of dolomites (see T. S. Hunt's Chemical and Geological Essays), but it is easy to see that the subject is capable of very large development.

One of the lines of investigation chief in importance is the influence which dolomitic limestone must exercise on the topography of a country. Prof. Lesley has shown that the grand effects of erosion can be explained by the slow solution and destruction of the limestones of the earth below water level, with the consequent caving in of the strata which rest on them.

It is easy to see that different kinds of effects would be produced by the rapid waste of pure carbonate of lime and the slower destruction of magnesian or dolomitic rocks. And the result of